

EVALUATION OF SOUTHERN PINE BEETLE INFESTATIONS ON THE
NOLICHUCKY, OCOEE, AND TELlico DISTRICTS OF THE
CHEROKEE NATIONAL FOREST, TENNESSEE

By

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INTRODUCTION

An evaluation of southern pine beetle, *Dendroctonus frontalis* Zimm., activity was conducted on three districts of the Cherokee National Forest during the fall of 1974. Districts included in the evaluation were the Tellico Ranger District (188,000 acres), Ocoee Ranger District (150,163 acres), and Nolichucky Ranger District (168,947 acres). These districts are located in the southeastern corner of Tennessee and are included in a South-wide outbreak of southern pine beetle involving 10 states (Figures 1 and 2).

Southern pine beetle is a native forest pest in this area, and outbreaks occur at irregular intervals, usually lasting from two to five years before they collapse. An outbreak which began on the Tellico District in 1967 subsided to a very low level in 1973. Recent detection surveys indicated a renewal of activity on this District. Southern pine beetle activity was detected on the Nolichucky District in the fall of 1973 and has increased rapidly during the last six months. The last outbreak on this District collapsed in 1955. Southern pine beetle has caused no serious problems on the Ocoee Ranger District. No known infestations have occurred on the District during the past eight years.

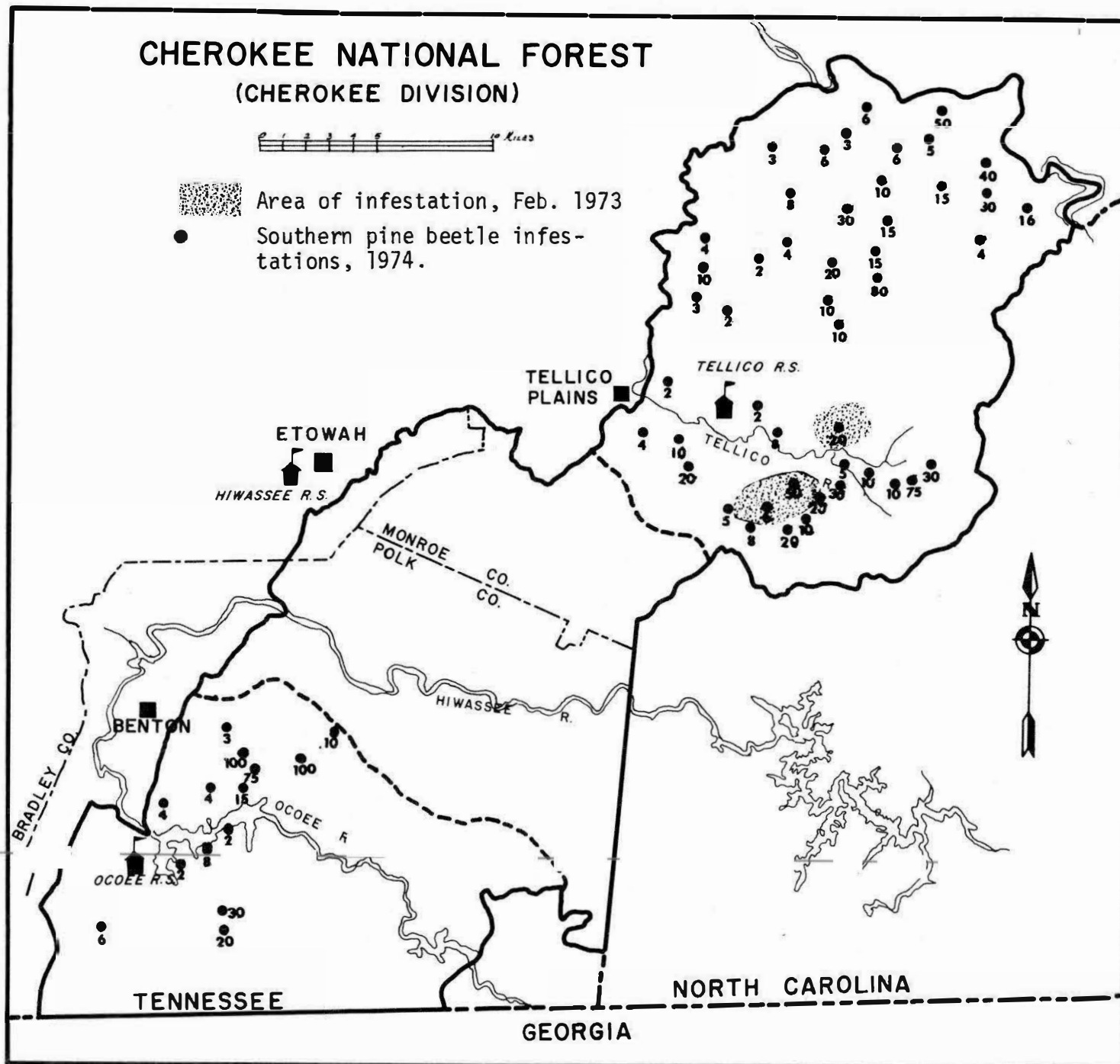
TECHNICAL INFORMATION

Insect - Southern pine beetle, *Dendroctonus frontalis* Zimm.

Hosts - Southern pine beetle is a native forest pest that will attack all species of southern yellow pine. However, loblolly pine, *Pinus taeda* L., and shortleaf pine, *P. echinata* Mill., are the preferred hosts.

Type of damage - Death of the tree is the result of mining in the cambium by the southern pine beetle as it constructs egg galleries. The beetle also introduces blue stain fungi, *Ceratoystis* spp., which slows down or blocks conduction of water in the stem.

Figure 1. Location of southern pine beetle infestations detected on Ocoee and Tellico Districts during 50 percent aerial sketchmap surveys of 1973 and 1974.



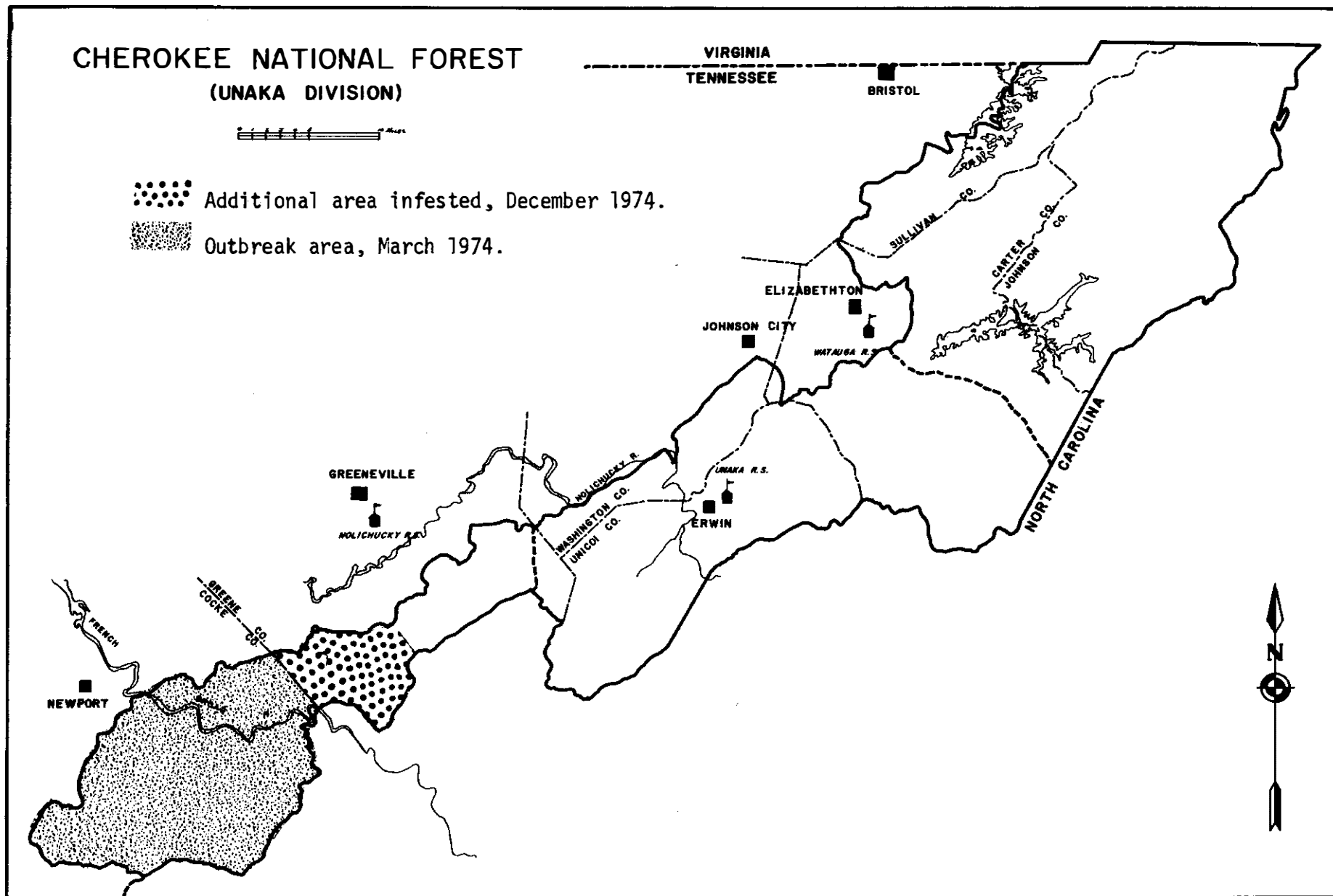


Figure 2. Location of southern pine beetle outbreak on the Nolichucky District, Cherokee National Forest, Tennessee, 1974.

Life cycle of the beetle - The beetles attack in pairs and construct a winding gallery in the cambium. Eggs are deposited in niches along the sides of the galleries. The eggs hatch into whitish grubs that further mine the cambium and then construct cells in the bark where they pupate or change to adults. The new adults then mine through the bark to emerge. The complete life cycle takes about a month during the summer and as many as four or five generations may be produced annually in this area.

METHODS

Standard aerial sketchmap and ground techniques were utilized during the current evaluations.^{1,2/} A 50-percent aerial sketchmap survey was conducted on each of the three areas to locate spots of dead and dying pines. A total of 18 spots were ground checked to confirm the cause of mortality, to determine the number of trees infested with southern pine beetle, and to observe the general condition of the beetles.

RESULTS AND DISCUSSION

Results of the current evaluations revealed an increasing southern pine beetle population on the Cherokee National Forest. The present level of beetle activity is high on the Nolichucky Ranger District (Tables 1 and 2).

Tellico Ranger District

The evaluation revealed beetle infestations in most of the 65,000 acres of host type on the District (Figure 1). This represents a dramatic expansion of the population since 1973 when the area of infestation had decreased to only 5,000 acres (Ward et al, 1973). This renewal of southern pine beetle activity on the Tellico was unexpected because it has occurred so soon after the collapse of the previous outbreak. Usually an outbreak, especially in this part of the South, will last from 2 to 5 years, collapse almost as suddenly as it began, and not occur again for 10 to 20 years. During the previous outbreak which began in 1967 there were always seasonal fluctuations in the population level but after the fall of 1972 the outbreak subsided to a low level and did not increase again until the summer of 1974. Aerial surveys conducted in 1973 showed very little beetle activity on the District. Infestations examined on a service trip in 1973 and early 1974 revealed

1/ Detection of Forest Pests in the Southeast, 1970. USDA, USFS, SA, S&PF, Div. FPM, Pub. S&PF-7, Atlanta, Ga. 51 pp.

2/ Evaluating Southern Pine Beetle Infestations, 1970. USDA, USFS, SA, S&PF, Div. FPM, Pub. FPM-8, Atlanta, Ga. 35 pp.

Table 1. Summary of results of southern pine beetle evaluations conducted on the Ocoee, Tellico, and Nolichucky Districts, Cherokee National Forest, Tennessee, 1974.

		Ownership Unit		
		Ocoee	Tellico	Nolichucky
1. Results compiled from data collected during the aerial phase of the evaluation:				
Survey type	Sketchmap	Sketchmap	Sketchmap	
Date of aerial survey	9/13/74	9/13/74	11/22/74	
Total acreage surveyed.	150,163	188,000	168,947	
Total susceptible host type	81,088	65,813	39,000	
Total number of spots within the survey boundary.	47	137	292	
Spots per M acres of host type	.6	1.7	7.5	
Average spot size (trees)	16	12.5	93	
Range of spot sizes (trees)	1-100	1-100	1-500	
2. Results compiled from data collected during the ground and aerial phases of the evaluation:				
Date of ground phase.	9/30/74	9/30/74	12/19/74	
Infested trees per M acre of host type.	9.3	20	631	
Total number of infested trees within the survey boundary	753	1308	24,624	
Ratio of green infested to total red and fading trees	1:1.4	1:2.4	1:2.2	
Brood density—insects per square foot of bark surface.	13,624 cu.ft.	26,150 cu.ft.	351,612 cu.ft.	

Table 2. Results of 50 percent aerial sketchmap surveys on the Tellico, Ocoee, and Nolichucky Ranger Districts of the Cherokee National Forest, Tennessee 1974.

Ownership	Infestation Size (No. of Trees)										
	2-5			6-20		21-50		50+		Total	
	Singles	Spots	Trees	Spots	Trees	Spots	Trees	Spots	Trees	Spots	Trees
Tellico R. D.	0	40	131	80	967	15	518	2	105	137	1721
Ocoee R. D.	9	15	40	15	187	4	126	4	400	47	762
Nolichucky	11	17	62	98	1265	58	2320	108	23402	292	27060

1/ Corrected according to data by Aldrich et. al. (1958); expanded to a 100 percent survey area coverage.

heavy mortality of parent adults and poor brood survival (Figure 3). However, the current evaluation revealed high brood density and brood survival.

The current potential for an outbreak on the Tellico is considered high. Unless natural factors such as low winter temperatures and woodpecker predation reduce the population, the District can expect a rapid increase in the number and size of infestations during the coming spring and summer.

Ocoee Ranger District

The beetle population is expanding rapidly on the Ocoee District as indicated by the high number of green infested trees in some of the spots ground checked. Although the population level is still considered low on this District, there is a high potential for a severe outbreak in 1975 unless the infestations are destroyed. New outbreaks of southern pine beetle are usually very destructive because it takes some time before natural enemies reach population levels high enough to check the beetle population.

Nolichucky District

The southern pine beetle population was at a very high level on the Nolichucky District during the current evaluation. The area of infestation has expanded, the number of spots has increased, and the size of spots has increased dramatically since the April 1974 evaluation (Ward, 1974). There were approximately 40,000 trees killed by the southern pine beetle on the Nolichucky District during summer and fall of 1974. Unless natural factors intervene, the outbreak is expected to continue at a high level in 1975.

RECOMMENDATIONS

Increasing southern pine beetle populations are expected to cause increased tree mortality on three districts of the Cherokee National Forest during 1975. In addition, infestations will probably spread to adjoining districts during the coming summer and fall.

It is unlikely that any type of suppression program can stop an outbreak of southern pine beetle after the population has reached a high level. However, losses can be drastically reduced if suppression is concentrated in high value stands. Guidelines for suppression of the beetle are outlined in the 5250 section of the Forest Service Manual and the Cherokee National Forest Project Control Plan.

(A)



(B)

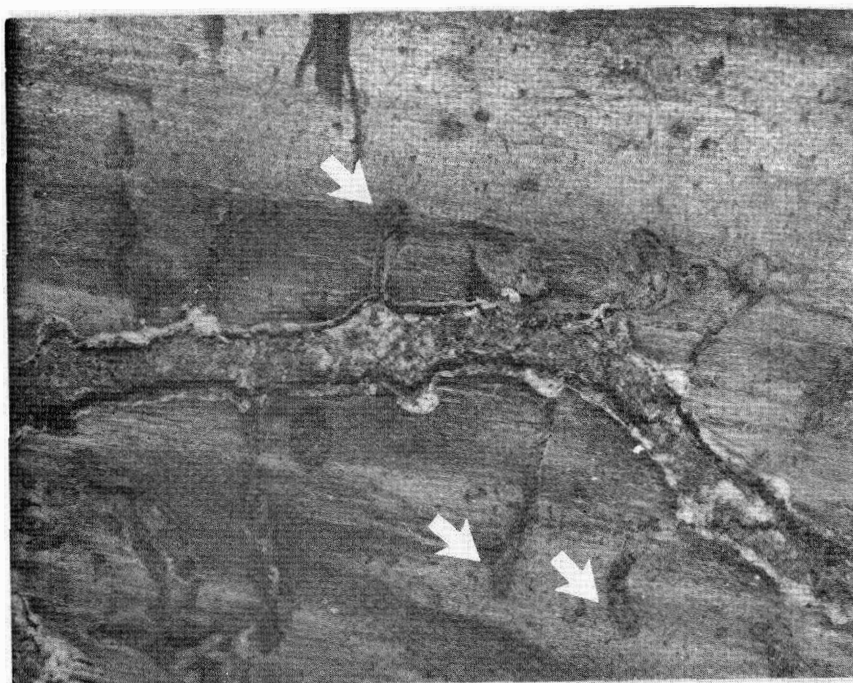


Figure 3. Heavy mortality of parent adults (A) and poor brood survival (B) were observed in all southern pine beetle infestations checked on the Tellico District during 1973 and early 1974.

REFERENCES

- Aldrich, R. C., R. C. Heller, and W. F. Bailey, 1958. Observation limits for aerial sketchmapping southern pine beetles in the southern Appalachians. Jour. For. 56(3):200-202.
- Ward, J. D., E. T. Wilson, and P. J. Barry. 1973. Evaluation of southern pine beetle infestations on the Tellico District of the Cherokee National Forest, Tennessee. Rpt. No. 73-1-30.
- Ward, J. D. 1974. Evaluation of southern pine beetle infestations of the Nolichucky District of the Cherokee National Forest, Tennessee. USDA, USFS, SA, S&PF, Forest Pest Management, Asheville, N. C. Rpt. No. 74-1-15.